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- 1 [Sizing Power/Ground Meshes for Clocking and Computing Circuit Components](#)
 A. Mukherjee, K. Wang, L. Chen, M. Marek-Sadowska
 March 2002 **Proceedings of the conference on Design, automation and test in Europe**

 Full text available: [pdf\(177.90 KB\)](#)
[Publisher Site](#)

 Additional Information: [full citation](#), [abstract](#)

This paper presents a new formulation and an efficient solution of the power and ground mesh sizing problem. We use the key observations that (1) the drops in power and ground node potentials are due not only to currents drawn by the computing blocks, but also to those drawn by the clock buffers, and (2) changes of circuit component delays are linearly proportional to the power/ground IR-drops. This leads to a linear quantification of the timing relations between the clocking and computing components in ...

- 2 [Power supply, voltage, and frequency management: Power utility maximization for multiple-supply systems by a load-matching switch](#)
 Chulsung Park, Pai H. Chou
 August 2004 **Proceedings of the 2004 international symposium on Low power electronics and design**

 Full text available: [pdf\(1.32 MB\)](#)

 Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

For embedded systems that rely on multiple power sources (MPS), power management must distribute the power by matching the supply and demand in conjunction with the traditional power management tasks. Proper load matching is especially critical for renewable power sources such as solar panels and wind generators, because it directly affects the utility of the available power. This paper proposes a power distribution switch and a source-consumption matching algorithm that maximizes the total util ...

Keywords: load matching, photovoltaics, power management, power model, solar energy, solar-aware

- 3 [Authentication and authorization: Silicon physical random functions](#)
 Blaise Gassend, Dwaine Clarke, Marten van Dijk, Srinivas Devadas
 November 2002 **Proceedings of the 9th ACM conference on Computer and communications security**

 Full text available: [pdf\(433.69 KB\)](#)

 Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We introduce the notion of a Physical Random Function (PUF). We argue that a complex integrated circuit can be viewed as a silicon PUF and describe a technique to identify and authenticate individual integrated circuits (ICs). We describe several possible circuit realizations of different PUFs. These circuits have been implemented in commodity Field Programmable Gate Arrays (FPGAs). We present experiments which indicate that reliable authentication of individual FPGAs can be performed even in the ...

Keywords: identification, physical random function, physical security, smartcard, tamper resistance, unclonability

4 Modeling and simulation in product development

Douglas G. Boike, Edward H. Ernst

March 1982 **Proceedings of the 15th annual symposium on Simulation**


Full text available:  [pdf\(401.24 KB\)](#) Additional Information: [full citation](#), [abstract](#), [index terms](#)

As part of the product development cycle, the Xerox Corporation has evolved a modeling and simulation methodology. This paper describes the approach, its use, and value in product development. To provide a common basis for understanding the modeling activities to be discussed, a brief overview of the xerographic process as used in our current duplicator copier products is described. Each of the functions is discussed in terms of how they contribute to the overall systems model and how they ...

5 Formal verification of algorithms for critical systems

John Rushby, Friedrich von Henke

September 1991 **ACM SIGSOFT Software Engineering Notes , Proceedings of the conference on Software for critical systems**, Volume 16 Issue 5

Full text available:  [pdf\(1.59 MB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

6 An interval-based framework for clock rate synchronization

Klaus Schossmaier

August 1997 **Proceedings of the sixteenth annual ACM symposium on Principles of distributed computing**


Full text available:  [pdf\(1.09 MB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

Keywords: clock synchronization, clock validation, consonance, convergence functions, distributed systems, drift, oscillator stability, rate intervals

7 Power Grid and Signal Integrity Analysis: Scaling trends of on-chip Power distribution noise

Andrey V. Mezhiba, Eby G. Friedman

April 2002 **Proceedings of the 2002 international workshop on System-level interconnect prediction**

Full text available:  [pdf\(110.79 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The design of power distribution networks in high performance integrated circuits has become significantly more challenging with recent advances in process technology. As on-chip currents exceed tens of amperes and circuit clock periods are reduced well below a nanosecond, the signal integrity of the on-chip power supply has become a primary concern in integrated circuit design. The existing work on power distribution noise scaling is reviewed and extended to include the scaling of the inductance ...

Keywords: power distribution, power supply noise, technology scaling

8 Transition density: a stochastic measure of activity in digital circuits

Farid N. Najm

June 1991 **Proceedings of the 28th conference on ACM/IEEE design automation**

Full text available:  pdf(622.95 KB) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)



9 System estimation and voltage scheduling: B#: a battery emulator and power profiling instrument

Pai H. Chou, Chulsung Park, Jae Park, Kien Pham, Jinfeng Liu

August 2003 **Proceedings of the 2003 international symposium on Low power electronics and design**

Full text available:  pdf(499.15 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)




This paper describes B# (B-sharp), a programmable power supply that emulates the behavior of a battery. It measures the current load, calls a battery simulation program to compute the voltage in real time, and controls a linear regulator to mimic the voltage output of a battery. This instrument enables validation of battery-aware power-optimization techniques with accurate, controllable, reproducible results. This instrument also supports training mode with actual batteries, and it can even be u ...

Keywords: battery emulation, power profiling instrument

10 Session S8.1: power and battery management: System lifetime extension by battery management: an experimental work

Davide Bruni, Luca Benini, Bruno Riccò

October 2002 **Proceedings of the 2002 international conference on Compilers, architecture, and synthesis for embedded systems**

Full text available:  pdf(131.85 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)




Many portable devices, like laptops and PDAs can be powered by different combinations of two or more battery packs to give the user the possibility to choose an optimal compromise between lifetime and weight/size. The common discharge policy for multiple battery packs is sequential, i.e., the system switches to the second pack when the first one is empty. In this work we demonstrate that this policy is not optimal by proving the effectiveness of two other policies, namely switched and series, wh ...

Keywords: battery, lifetime extension, power management

11 OPERAS in a DSP CAD environment

James B. Burr, Allen M. Peterson, Gerard K. Yeh, Kallol Bagchi

September 1994 **Proceedings of the conference on European design automation**

Full text available:  pdf(650.32 KB) Additional Information: [full citation](#), [references](#), [index terms](#)




12 Managing energy and server resources in hosting centers

Jeffrey S. Chase, Darrell C. Anderson, Prachi N. Thakar, Amin M. Vahdat, Ronald P. Doyle

October 2001 **ACM SIGOPS Operating Systems Review , Proceedings of the eighteenth**




ACM symposium on Operating systems principles, Volume 35 Issue 5Full text available:  [pdf\(1.61 MB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Internet hosting centers serve multiple service sites from a common hardware base. This paper presents the design and implementation of an architecture for resource management in a hosting center operating system, with an emphasis on *energy* as a driving resource management issue for large server clusters. The goals are to provision server resources for co-hosted services in a way that automatically adapts to offered load, improve the energy efficiency of server clusters by dynamically res ...

13 Battery-Driven System Design: A New Frontier in Low Power Design

Kanishka Lahiri, Sujit Dey, Debashis Panigrahi, Anand Raghunathan

January 2002 **Proceedings of the 2002 conference on Asia South Pacific design automation/VLSI Design**Full text available:  [pdf\(898.18 KB\)](#)Additional Information: [full citation](#), [abstract](#), [citations](#) [Publisher Site](#)

As an increasing number of electronic systems are powered by batteries, battery life becomes a primary design consideration. Maximizing battery life requires system designers to develop an understanding of the capabilities and limitations of the batteries that power such systems, and to incorporate battery considerations into the system design process. Recent research has shown that, the amount of energy that can be supplied by a given battery varies significantly, depending on how the energy i ...

14 Performance aware tasking for environmentally powered sensor networks

Aman Kansal, Dunny Potter, Mani B. Srivastava

June 2004 **ACM SIGMETRICS Performance Evaluation Review , Proceedings of the joint international conference on Measurement and modeling of computer systems**, Volume 32 Issue 1Full text available:  [pdf\(384.08 KB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

The use of environmental energy is now emerging as a feasible energy source for embedded and wireless computing systems such as sensor networks where manual recharging or replacement of batteries is not practical. However, energy supply from environmental sources is highly variable with time. Further, for a distributed system, the energy available at its various locations will be different. These variations strongly influence the way in which environmental energy is used. We present a harvesting ...

Keywords: energy harvesting, performance guarantees, process scheduling**15 Session 5A: Embedded tutorial: embedded software and systems: Low power system scheduling and synthesis**

Niraj K. Jha

November 2001 **Proceedings of the 2001 IEEE/ACM international conference on Computer-aided design**Full text available:  [pdf\(168.32 KB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Many scheduling techniques have been presented recently which exploit dynamic voltage scaling (DVS) and dynamic power management (DPM) for both uniprocessors and distributed systems, as well as both real-time and non-real-time systems. While such techniques are power-aware and aim at extending battery lifetimes for portable systems, they need to be augmented to make them battery-aware as well. We will survey such power-aware and battery-aware scheduling algorithms. Also, system synthesis algorit ...

16 Noise in deep submicron digital design

Kenneth L. Shepard, Vinod Narayanan

January 1997 **Proceedings of the 1996 IEEE/ACM international conference on Computer-aided design**Full text available:  [pdf\(255.49 KB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#) [Publisher Site](#)

As technology scales into the deep submicron regime, noise immunity is becoming a metric of comparable importance to area, timing, and power for the analysis and design of VLSI systems. This paper defines noise as it pertains to digital systems and addresses the technology trends which are bringing noise issues to the forefront. The noise sources which are plaguing digital systems are explained. A metric referred to as noise stability is defined, and a static noise analysis methodology based on ...

Keywords: noise, CMOS circuits, static analysis, crosstalk, inductance, noise margins

17 Low-power: Low-complexity reorder buffer architecture

Gurhan Kucuk, Dmitry Ponomarev, Kanad Ghose

June 2002 **Proceedings of the 16th international conference on Supercomputing**Full text available:  [pdf\(120.97 KB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

In some of today's superscalar processors (e.g. the Pentium III), the result repositories are implemented as the Reorder Buffer (ROB) slots. In such designs, the ROB is a complex multi-ported structure that occupies a significant portion of the die area and dissipates a non-trivial fraction of the total chip power, as much as 27% according to some estimates. In addition, an access to such ROB typically takes more than one cycle, impacting the IPC adversely. We propose a low-complexity and low-power ...

Keywords: low-complexity datapath, low-power design, reorder buffer

18 Synthesis for Low Power: An energy efficient rate selection algorithm for voltage quantized dynamic voltage scaling

Lama H. Chandrasena, Priyadarshana Chandrasena, Michael J. Liebelt

September 2001 **Proceedings of the 14th international symposium on Systems synthesis**Full text available:  [pdf\(259.53 KB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

This paper presents a highly energy efficient alternative algorithm to the conventional workload averaging technique for voltage quantized dynamic voltage scaling. This algorithm incorporates the strengths of the conventional workload averaging technique and our previously proposed Rate Selection Algorithm, resulting in higher energy savings while minimizing the buffer size requirement and improving the overall system stability by minimizing the number of voltage transitions. Our experimental work ...

19 Military applications: Logistics 1: closed-loop simulation-based systems engineering approach to life cycle management of defense systems

Sean Connors, Julie Gauldin, Marshall Smith

December 2002 **Proceedings of the 34th conference on Winter simulation: exploring new frontiers**Full text available:  [pdf\(268.18 KB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#)

Assessing the life-cycle impacts of operations and maintenance decisions made for new or aging systems requires an accurate ability to measure and respond to uncertainty.


Maintenance and parts requirements forecasts for fielded military systems are traditionally performed through historical repair and supply demand models. These models work well once several years of steady state weapon system operation has been accomplished, but tend to depend on a stable and somewhat regular operations and ...

20 [A structural view of the Cedar programming environment](#)

Daniel C. Swinehart, Polle T. Zellweger, Richard J. Beach, Robert B. Hagmann

August 1986 **ACM Transactions on Programming Languages and Systems (TOPLAS)**,

Volume 8 Issue 4

Full text available:  [pdf\(6.32 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)





This paper presents an overview of the Cedar programming environment, focusing on its overall structure—that is, the major components of Cedar and the way they are organized. Cedar supports the development of programs written in a single programming language, also called Cedar. Its primary purpose is to increase the productivity of programmers whose activities include experimental programming and the development of prototype software systems for a high-performance personal computer. T ...

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1 Planning response to increase system reliability of the aging T&D infrastructures*Hajagos, J.T.;*

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2 Influence of some voltage waveform characteristics on the partial discharge patterns: application to a PWM power supply*Lebey, T.;*

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3 The needs of industry for reliable inspection-thermal power generation needs*Lyon, R.; Kenny, S.;*

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4 Extending life by half [nuclear power plant relicensing]*Amber, D.P.;*

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